

Summary Report

June 1995

Remedial Action Plan for the Saginaw River and Saginaw Bay Area of Concern

Summary Report

This document is a summary of the 2-volume report entitled, "Saginaw River/Bay Remedial Action Plan, 1995 Biennial Report". This summary contains the main issues identified in the Remedial Action Plan (RAP). Hopefully, this document will provide the general reader with the basic information needed to understand the overall concepts identified in the RAP, where they are discussed in greater detail.

Although the Michigan Department of Natural Resources (MDNR) has been designated as the lead agency to prepare the RAP, the 1995 biennial report was jointly prepared by numerous governmental agencies (local, state, and federal), public organizations, and business representatives, through the committee structure of the Saginaw Bay National Watershed Initiative. The main groups responsible include the Saginaw Bay National Watershed Initiative Program Advisory Committee and the three Technical Advisory Committees on Water Quality, Soil Erosion and Sedimentation, and Habitat. The MDNR would like to thank the members of these committees for their time and effort to ensure that the technical issues were presented based on sound scientific principals.

The MDNR would like to thank all of the individuals and agencies involved for their time, effort and insight. Hopefully, implementation of the RAP will meet the needs of the continuing efforts to protect and restore the Saginaw Bay Watershed.

For additional copies of this summary and/or the RAP, you can contact any of the organizations below:

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Saginaw Bay Visitor Center Bay City State Recreation Area 3582 State Park Drive Bay City, MI 48706 517-791-0701

VISION FOR THE SAGINAW BAY WATERSHED

As part of the remedial action planning process, the following vision was developed to help direct present and future efforts by all parties to protect and restore the Saginaw Bay Watershed.

Saginaw Bay and its watershed will provide a safe, enjoyable, balanced environment with clean water for all forms of life. The Bay will support the wide range of multiple uses and benefits typical of a Great Lakes embayment. Basin rivers, streams, lakes, drains, and other waters within the watershed will also support multiple uses, while at the same time protecting the water quality of Saginaw Bay. Both the Bay and the watershed will provide for biodiversity, naturally self-sustaining indigenous populations, good public health, recreational opportunities. and economic viability.

Participatory management efforts will foster optimization of uses and benefits without exceeding the carrying capacity of the ecosystem, while maintaining the flexibility to address the often conflicting natures of those uses. Management will include emphasis on the ecosystem approach to watershed management and creating an informed, knowledgeable public through environmental education.

The watershed will contain citizens committed to regional cooperation and a personal philosophy of stewardship. It will be a place where citizens accept the personal responsibility and challenge of pollution prevention in their own lives and lifestyles, and are committed to moving from a consumer society to a conserver society. Furthermore, there will be greater cooperation, leadership, and responsibility among citizens of the basin for defining longterm policies and procedures that will protect the quality and supply of water in Saginaw Bay and its watershed for future generations.

To achieve this vision, Saginaw Bay and its watershed shall functional loss of habitat.

be protected against further degradation of water quality or Furthermore, existing environmental conditions will be improved to restore all

currently impaired beneficial uses in the Saginaw River and Saginaw Bay and enhance other water-related uses in the Bay and the watershed, as appropriate. These protection, restoration, and enhancement activities will be conducted through the sound management of human, economic, and ecological resources.

This vision statement is important because it helps focus the efforts of all those involved in the activities associated with the Remedial Action Plan and other efforts to restore and protect the Saginaw Bay watershed.

VISION PRINCIPLES

- * safe, enjoyable, balanced environment
- * support the wide range of multiple uses
- * biodiversity, naturally selfsustaining populations
- * good public health
- * economic viability
- * informed, knowledgeable public
- regional cooperation
- * philosophy of stewardship
- * accept personal challenge of pollution prevention
- * greater cooperation, leadership
- protect against further degradation
- * restore impaired beneficial uses
- * sound management of human, economic and ecological resources

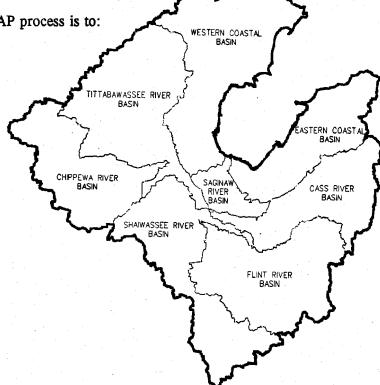
Overview

The Saginaw River and Saginaw Bay have been listed as one of 43 Great Lakes Areas of Concern because degraded water quality conditions impair a number of beneficial uses. The State of Michigan has implemented a Saginaw River/Bay Remedial Action Plan (RAP) process to address these water quality concerns.

The purpose of the Saginaw River/Bay RAP process is to:

- * identify the environmental problems and their causes in the watershed;
- * define water use goals for the watershed; and
- * identify and implement actions to attain and support these goals.

The RAP serves as the technical, planning, and project implementation focus for addressing problems and is intended to be used by all agencies, organizations and individuals concerned with, affected by, or impacting water quality. Extensive efforts have been made to include all interested and affected parties in the development of the RAP so that it addresses the issues from a variety of perspectives and is broadly supported.



The RAP process is biennial and iterative in nature. The 1995 RAP focuses on nutrients, sedimentation and hydrological concerns in the watershed. The next biennial RAP will focus on toxic issues such as contaminated sediments, point sources discharges, and others sources of toxics to the watershed.

Watershed Description

The Saginaw Bay Watershed is the largest in Michigan. Twenty-eight major rivers, creeks, or agricultural drains flow directly into Saginaw Bay, but about 75 percent of the flow to the Bay comes from the Saginaw River. The Saginaw River itself is only 22 miles long and most of its flow originates from the four major tributaries - the Cass, Flint, Shiawassee and Tittabawassee rivers. Saginaw Bay with surface area of 1,143 square miles is an extension of Lake Huron. The Saginaw Bay Watershed is home to about 1.4 million people in 22 counties and contains 8,709 square miles, approximately 15 percent of Michigan's total land area.

Land use in the watershed is very diverse, ranging from relatively undisturbed natural areas, to intensive agriculture and heavily industrialized urban settings. The majority of industrial activity is in the four major urban centers - Bay City, Saginaw, Flint, and Midland. Agriculture comprises approximately 50 percent of the land use.

Saginaw Bay is also a major recreational area. It has a world-class walleye sport fishery and is a popular bird watching destination. The most outstanding habitat feature is the expansive coastal wetlands of the Bay, which is the largest remaining freshwater coastal wetland system in the nation. Consequently, the Bay is particularly valuable to Lake Huron fish and wildlife communities as a major breeding and nursery area.

Water Quality Problems

The major problems in the watershed are excessive nutrients, toxic contamination, and sedimentation. Bacterial contamination has also been a problem periodically in localized areas of the Watershed. These environmental conditions have degraded plant and animal communities, resulted in fish consumption and body contact advisories, affected taste in drinking water supplies, created nuisance aesthetic conditions, and restricted navigational channel dredging activity. Additionally, loss of fish and wildlife habitat is a concern.

Nutrient enrichment contributes to the greatest number of use impairments, followed by sedimentation. Toxic contaminants are also thought to contribute to use impairments. Impairment of beneficial use is defined as a change in the chemical, physical, or biological integrity of the watershed causing any of the problems described in the adjacent box.

WATER QUALITY PROBLEMS

- restrictions on fish and wildlife consumption;
- degradation of fish and wildlife populations
- * fish tumors or other deformities
- bird or animal deformities or reproductive problems;
- * degradation of benthos
- * restrictions on dredging activities;
- eutrophication or undesirable algae;
- restrictions on drinking water consumption, or taste and odor problems;
- * beach closings;
- * degradation of aesthetics;
- added costs to agriculture or industry;
- * degradation of phytoplankton and zooplankton populations;
- * loss of fish and wildlife habitat.

Saginaw Bay Watershed Prioritization Process

In an effort to better define problem areas and sources of impacts, a sub-watershed prioritization process was developed. The watershed was divided into smaller sub-watersheds for which it is easier to summarize data and more comprehensible to resource managers and the general public. Sub-watersheds are hydrological units defined by topographic contour and range in size from 13,448 to 242,534 acres. The purpose of evaluating sub-watersheds is improve coordination of monitoring, planning, and implementation activities among governmental federal agencies, local businesses, and public organizations.

Three technical advisory committees (TACs) addressing Water Quality, Habitat, and Soil Erosion and Sedimentation were established to help summarize existing information. The TACs were composed of representatives from state, federal, and local interests.

Water Quality

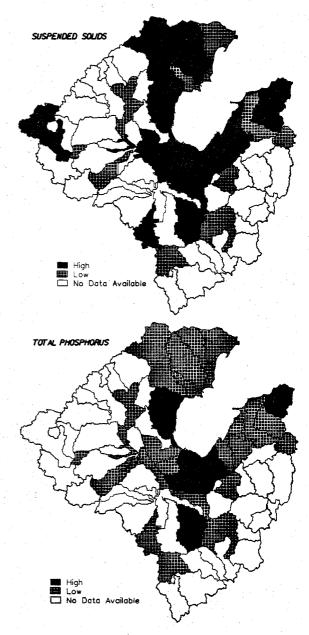
The water quality component compares the water quality of rivers within the watershed to each other and, where applicable to Michigan's water quality standards. The primary concerns in the watershed are suspended solids, phosphorus, and nitrogen. These pollutants can cause nuisance algae problems and other water quality problems.

Suspended Solids

The highest annual average total suspended solids concentration by far was in the Northwest Drain. The four next highest concentrations were found in east coastal basin tributaries.

Phosphorus

The highest total phosphorus concentrations were also found in the southern portion of the east coastal basin. The highest concentration was found in the Quanicassee River, followed by both the Northwest Drain and the Pinconning River. Approximately 85 percent of the phosphorous entering Saginaw Bay each year is from nonpoint sources.



Land Use

Land use has a very important relationship to stream quality. Agriculture is the most dominant land use in most of the sub-watersheds. Only one sub-watershed was identified as having urban as a majority of land use. Forested land was dominant in about 1/4 of the subwatersheds.

Nitrogen

The subwatersheds in the southern portion of the east coastal basin had the highest concentrations of nitrite-nitrate. The Pigeon, Pinnebog, and Pinconning rivers were close behind. Among the major Saginaw River tributaries, the concentration in the Cass River was much higher than others.

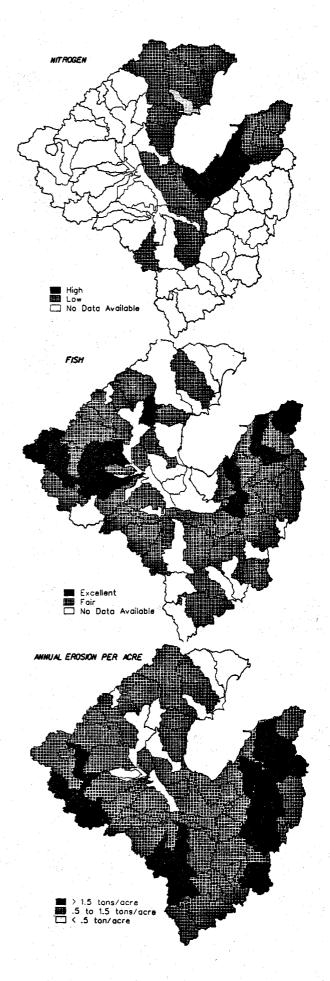
Aquatic Biology

Important indicators of stream quality are the types of fish, diversity of benthic macroinvertebrates (animals living on the stream bottom), and physical habitat conditions. Fish communities and macroinvertebrates provide a direct measure of the health of the sub-watershed and a means to identify causes of water quality problems.

Within the watershed, over half of the subwatersheds sampled demonstrated impaired fish and macroinvertebrate communities.

Point Source Pollution

Point sources of pollution, municipal and industrial wastewater discharges, are a concern for water quality in the watershed. There are 273 permitted municipal and industrial discharges. This biennial RAP only considers municipal discharges because they constitute the majority of nutrients and suspended solids discharged to the watershed from point sources. In most instances, point source facilities meet their discharge requirements. As a result, the existence of point source discharges only indicates a potential concern.



Goals for the Saginaw Bay Watershed

Specific goals have been established as part of the remedial action planning process. These goals are important because they describe conditions that are desired in the long-term restoration and protection efforts. Some of the more important goals are as follows.

Water Quality

- * Meet water quality standards for surface water and groundwater.
- * Achieve a mean phosphorus concentration of 15 ug/l or less in inner Saginaw Bay and reduce the annual phosphorus load to Saginaw Bay to less than 440 metric tons.
- * Achieve a mean total phosphorus concentration in flowing waters of 0.1 mg/l or less and 50 mg/l for total suspended solids.

Biological Communities

- * Reduce toxic contaminant levels in fish to eliminate fish consumption advisories.
- * Restore a balanced fishery in Saginaw Bay by enhancing the numbers of predaceous game fish.
- * Reestablish diverse, abundant benthic macroinvertebrate populations to support critical needs of fish and wildlife.
- * Reduce populations of nuisance species and restore a balanced diverse biological community.

Habitat

- * Protect, enhance and restore wetlands and other habitats to support fish and wildlife.
- * Restore drained wetlands along riparian corridors and the Bay.
- * Encourage habitat restoration, removal of dams, and construction of fishways to enhance walleye populations.

SUMMARY OF GOALS

- * Meet water quality standards
- * Reduce phosphorus to the bay
- Reduce phosphorus and suspended solids in streams
- * Restore a balanced fishery
- * Support critical needs of fish and wildlife
- * Reduce toxic contaminant levels in fish
- Protect and restore wetlands and other habitat
- * Eliminate decomposing algae and other organic material on beaches
- Enhance recreational boating access
- Develop integrated land use planning
- * Implement best management practices
- Restore natural hydrologic characteristics
- * Public education and involvement

Recreation

- * Prevent the need for any body contact advisories by preventing bacterial contamination.
- * Eliminate the degradation of swimming beaches from decomposing organic debris.
- * Enhance recreational boating access through targeted land acquisition and facility development, taking advantage of existing deep water channels.
- * Upgrade interpretive facilities along Saginaw Bay.

Controlling Pollution Sources

- * Develop integrated land use planning throughout the watershed.
- * Implement best management practices to reduce erosion, sedimentation, and habitat loss.
- * Adequately treat all combined sewer overflows.
- * Reduce phosphorus loads from point sources.

Hydrology

- * Reduce pollutant transport and flooding associated with runoff events.
- * Maintain adequate base flows in the watershed.
- * Continue to preserve and restore natural hydrologic characteristics for balanced plant and animal communities.

Public Education

* Continue to develop an ecologically educated public that can make knowledgeable decisions on environmental issues.

Actions Already Implemented

The Saginaw River/Bay RAP process began in 1986 with the initial RAP completed in 1988. The RAP identified 101 actions that should be taken to further address the environmental problems. The 1988, estimated cost of implementing these actions was \$170 million, not including costly contaminated sediment clean-ups, if needed.

Since completion of the RAP, over two-thirds of the 101 actions have been at least partially implemented. All of these priority actions have been at least partially implemented. Additionally, because of the broad nature of many of the actions, the number of projects undertaken are so numerous that they likely number in the thousands.

Recommended Future Actions

Activities need to be undertaken to further address the problems in the Saginaw Bay Watershed and those outlined in the RAP are presented as current perceptions of needed actions. These actions are subject to further evaluation consistent with changing information and environmental conditions.

Public Involvement

A public that is informed about the watershed is the critical foundation for implementing actions to improve environmental conditions. Public support for action is necessary to develop support for resources necessary for the implementation of the proposed actions. It is important that the diverse group of resource users in the watershed develop an understanding of each other's needs and perspectives.

- * The Partnership for the Saginaw Bay Watershed should continue to provide involvement and educational opportunities.
- * The Saginaw Bay National Watershed Initiative should help focus programs on common goals.

Land Use

A recent land use study of the watershed made specific recommendations summarized below.

- * Provide resources for wetlands, lakes and streams, and other permitting programs.
- * Review and revise state acts dealing with planning and zoning, contaminated site cleanups, and subdivision control, and encourage cooperation among local communities,
- * Empower local governments with new land use control tools and encourage effective use of existing authorities to guide future development.

Nonpoint Sources

Nonpoint sources contribute 85 percent of the phosphorus load to Saginaw Bay. Agriculture is the predominant land use and the largest contributor of nutrients. Other major nonpoint sources include construction sites, stormwater, and runoff from residential lawns. The following actions are needed:

- * Encourage pollution prevention by expanding the use of Best Management Practices (BMPs), such as conservation tillage, filter strips, and streambank stabilization in a systems approach.
- * Target priority areas with high pollutant delivery.

Point Source Controls

Wastewater discharges from municipal and industrial facilities continue to contribute pollutants to the watershed. Efforts need to be continued to further reduce discharges where possible.

* Increase permit compliance monitoring efforts and use geographic information system.

Atmospheric Deposition

Little is known about atmospheric deposition and lack of data hampers efforts to relate atmospheric inputs with other pollution sources.

* Identify and quantify atmospheric deposition of pollutants.

Hydrology

In addition to water quality, water quantity is important to restoring and protecting the watershed resources.

* Drain commissioners should expand their traditional roles as water quantity managers by incorporating practices to enhance and protect water quality in drainage projects.

Water Quality Monitoring

Water is a major transportation and exposure medium. Several actions are described to track water quality trends.

- * Pollutants should be periodically monitored to track water quality and flow trends.
- * A nonpoint source monitoring program should be developed.
- * A nutrient budget for the Bay should be developed to determine if reductions in phosphorus have achieved the desired results.

Biological Monitoring

The biological communities are endpoints to which much of the RAP is addressed and monitoring may identify water quality trends problem areas.

- * Biological surveys should be undertaken to evaluate community structures and track trends.
- * Fish populations should be surveyed to assess changes, including natural recruitment rates for walleye.
- * Biological surveys should be conducted on sub-watersheds where no information is available.

Data Integration

Data should be integrated into user friendly systems to provide accessible information to local, state and federal policy makers and interested citizens.

If you would like to get more involved in activities to help restore and protect the resources of the Saginaw Bay Watershed you can contact one of the following:

The Partnership for Saginaw Bay Watershed Saginaw Valley State University Pioneer Annex 9A University Center, MI 48710 517-791-7367

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